

Audit



Report

OFFICE OF THE INSPECTOR GENERAL

**DOD'S EVALUATION AND ANALYSIS OF
ELECTRONIC COMBAT**

Report No. 93-074

March 26, 1993

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Department of Defense

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The following acronyms are used in this report.

AFC.....Area Frequency Coordinator
AFEWC.....Air Force Electronic Warfare Center
CE.....Communications-Electronics
CECOM.....Communications Electronics Command
CENTCOM.....Central Command
CIM.....Corporate Information Management
CINC.....Commander-in-Chief
EC.....Electronic Combat
ECAC.....Electromagnetic Compatibility
 Analysis Center
EW.....Electronic Warfare
FMC.....Frequency Management Center
FRRS.....Frequency Resource Record System
JCS.....Joint Chiefs of Staff
JEWEC.....Joint Electronic Warfare Center
JFMO.....Joint Frequency Management Office
MCEB.....Military Communications-Electronics Board
MOP.....Memorandum of Policy
NAVEMSCEN.....Naval Electromagnetic Spectrum Center
NTIA.....National Telecommunications and
 Information Administration
OSD.....Office of the Secretary of Defense



INSPECTOR GENERAL
DEPARTMENT OF DEFENSE
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March 26, 1993

MEMORANDUM FOR ASSISTANT SECRETARY OF DEFENSE (COMMAND,
CONTROL, COMMUNICATIONS AND INTELLIGENCE)
ASSISTANT SECRETARY OF THE NAVY (FINANCIAL
MANAGEMENT)
ASSISTANT SECRETARY OF THE AIR FORCE
(FINANCIAL MANAGEMENT AND COMPTROLLER)
INSPECTOR GENERAL, DEPARTMENT OF THE ARMY
DIRECTOR, JOINT STAFF

SUBJECT: Audit Report of DoD's Evaluation and Analysis of
Electronic Combat (Report No. 93-074)

We are providing this final report for your information and use. The report addresses the issue of central management of the electromagnetic spectrum. Although measures have been taken to coordinate use of the electromagnetic spectrum more effectively, we believe that further improvements, including organizational changes, are needed.

Comments on a draft of this report were received from the Deputy Assistant Secretary of Defense (Defense-Wide Command, Control, Communications & Intelligence); the Department of the Army, Office of the Director of Information Systems for Command, Control, Communications, & Computers; and the Department of the Air Force, Deputy Chief of Staff for Command, Control, Communications, and Computers. Those comments were considered in preparing the final report.

DoD Directive 7650.3 requires that all audit recommendations be resolved promptly. Therefore, addressees must provide comments on the final report by May 26, 1993, after which time we will forward the report and your responses to the Deputy Secretary of Defense for decision.

We appreciate the courtesies extended to the audit staff. If you have any questions on this audit, please contact Mr. Raymond Spencer, Program Director, at (703) 614-3995 (DSN 224-3995) or Mr. Michael Simpson, Project Manager, at (703) 693-0371 (DSN 223-0371). Appendix F lists the distribution of this report.



Robert J. Lieberman
Assistant Inspector General
for Auditing

Enclosure

cc:
Secretary of the Army
Secretary of the Navy
Secretary of the Air Force

Office of the Inspector General, DoD

REPORT NO. 93-074
(Project No. 2AB-0024)

March 26, 1993

DoD'S EVALUATION AND ANALYSIS OF ELECTRONIC COMBAT

EXECUTIVE SUMMARY

Introduction. The audit addressed electronic combat as well as the management and use of the electromagnetic spectrum in DoD. The electromagnetic spectrum is the range of frequencies of electromagnetic radiation from zero to infinity. DoD use of the spectrum encompasses the air, land, sea, and space environments. Effective management of the electromagnetic spectrum is essential for the success of military operations. The Services each have established Frequency Management Centers to implement their Services' use of the electromagnetic spectrum.

Objectives. The audit objective was to evaluate the mission and management of the Air Force Electronic Warfare Center (AFEWC) and the Joint Electronic Warfare Center (JEWEC). We evaluated DoD's oversight of these centers, coordination of Electronic Warfare (EW) missions among the Military Departments, and validation of Electronic Warfare requirements as they relate to combat evaluation and analyses.

Audit Results. During the audit we determined there was no unwarranted duplication of missions between the AFEWC and the JEWEC. We did, however, determine that there is no central management agency within DoD to manage the electromagnetic spectrum. DoD spectrum management is fragmented. As a result, the Services' ability to use the electromagnetic spectrum effectively could be adversely impacted (Part II).

Internal Controls. We assessed internal control procedures implemented to ensure that DoD's oversight, management, and coordination of Electronic Combat Missions among the Military Departments were effective. We determined that the Office of the Secretary of Defense (OSD) and the Military Departments have internal controls in place to avoid the duplication of Electronic Combat systems.

Further, OSD has the internal controls necessary to prevent the duplication of efforts in Frequency Management among the Military Departments.

Potential Benefits of Audit. The potential savings cannot be fully quantified until the recommendation is implemented. However, we determined that civilian billets could be more effectively used with the consolidation of the Services' Frequency Management Centers. Any savings associated with the billets are within the Defense Management Report goal of streamlining management to reduce overhead costs (Appendix C).

Summary of Recommendations. We recommended that the Deputy Secretary of Defense consolidate the Services' Frequency Management Centers into a central agency responsible for managing the spectrum.

Management Comments. The Deputy Secretary of Defense did not respond to the draft report. However, The Deputy Assistant Secretary of Defense (Defense-Wide Command, Control, Communications & Intelligence); the Department of the Army, Office of the Director of Information Systems for Command, Control, Communications, & Computers; and the Department of the Air Force, Deputy Chief of Staff for Command, Control, Communications, and Computers all nonconcur with the finding, recommendation, and estimated monetary benefits. Comments on the final report are required by May 26, 1993. See Part IV for a complete text of the management comments.

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This report was prepared by the Acquisition Management Directorate, Office of the Assistant Inspector General for Auditing, DoD. Copies of the report can be obtained from the Information Officer, Audit Planning and Technical Support Directorate, (703) 614-6303 (DSN 224-6303).

PART I - INTRODUCTION

Background

The electromagnetic spectrum is the range of frequencies of electromagnetic radiation from zero to infinity. Electronic combat (EC) is an action that supports military operations using the entire radio, radar, and infrared frequency spectrum to achieve military objectives. The EC includes electronic warfare (EW); elements of command, control, communication, and countermeasures; and suppression of enemy air defenses. The importance of EC was made evident during the Southeast Asian conflict when United States' tactical aircraft faced significant numbers of surface-to-air missiles. Realizing the need to address EC, the DoD decided that an organization was needed for this function.

In 1966, the Air Force Electronic Warfare Center (AFEWC) was established to conduct analysis of EC/EW during the Southeast Asian conflict. Detailed analyses of the EC/EW conflicts were made to determine which electronic countermeasures worked best. Small detachments of the Army, Navy, and Marine Corps were assigned to the AFEWC until 1980 when DoD established the Joint Electronic Warfare Center (JEWEC) for joint EC/EW efforts.

The Services have each established a Frequency Management infrastructure to implement its Service's use of the electromagnetic spectrum. The Services address all aspects of DoD's management and use of the spectrum. The Services represent spectrum requirements in negotiating DoD, national, and international spectrum-management policy. In addition, they develop Service spectrum-management policy and review and coordinate all Service requests for equipment frequency allocations and assignments.

The aim of the spectrum management function is to ensure that users of spectrum-dependent systems can operate their systems so that they can accomplish their missions without suffering or causing unacceptable degradation because of electromagnetic radiation or response. Effective planning and management of the electromagnetic spectrum is imperative for successful military operations during peacetime and wartime. The importance of being able to coordinate and manage the frequency spectrum was illustrated during Operation Desert Shield when more than 29,000 frequencies were in use at any given time.

Objectives

The overall audit objectives were to evaluate the mission and management of the AFEWC and the JEWEC, DoD's oversight of these centers, coordination of the Electronic Combat missions among the Military Departments, and Office of the Secretary of Defense (OSD) efforts to streamline management and evaluate applicable internal controls. In addition, we reviewed the methods used by

OSD and the Military Departments to manage the frequency spectrum. Detailed results of our review are in the "Other Matters of Interest" and "Finding and Recommendation" sections of this report.

Scope

This economy and efficiency audit was made from February through August 1992 in accordance with auditing standards issued by the Comptroller General of the United States as implemented by the Inspector General, DoD, and accordingly included such tests of internal controls as were considered necessary. We reviewed and analyzed mission and function statements, regulations and directives, funding documents, utilization records and workload summaries for FYs 1991 and 1992 for the Joint Electronic Warfare Center and Air Force Electronic Warfare Center. We reviewed the missions and functions for the Electromagnetic Compatibility Analysis Center and the Frequency Management Centers for the Army, Navy, and Air Force. Appendix E lists the activities visited or contacted during the audit.

Internal Controls

We assessed internal control procedures associated with the DoD's oversight, management, and coordination of Electronic Combat Missions among the Military Departments. We determined that OSD and the Military Departments have internal controls to avoid the duplication of EC systems. Further, the DoD has internal controls to prevent the duplication of efforts in Frequency Management Centers.

Prior Audits and Other Reviews

The 1989 Joint Air Force-Army Report, "Radio Spectrum Management in Joint Tactical Operations," showed that "the Army frequency manager had a very limited role in addressing the wartime frequency management process." The report also concluded that there is a need for a single office or agency to act as a focal point to resolve issues involving major functional users of the spectrum, i.e. electronic warfare, intelligence, and communications communities.

The 1989 Air Force study, "Combining DoD Functions Involved in Electromagnetic Spectrum Management," examined the Electromagnetic Compatibility Analysis Center (ECAC), the Military Departments' Frequency Management Centers (FMCs), the Joint Electronic Warfare Center, and the Air Force Electronic Warfare Center. The study showed that there were few, if any, duplicative functions between ECAC and the FMCs.

Other Matters of Interest

As previously stated, one objective was to evaluate the mission and management of the JEWG and the AFEWC to identify duplication of efforts. Our review determined:

- o The mission of the AFEWC is to provide EC evaluation, analysis, and planning support during combat, contingency exercises, and test activities for the Air Force. The AFEWC also reviews Air Force EC acquisition requirements and is responsible for operating and maintaining common-user EW-support data bases for the AFEWC and the JEWG. The AFEWC provides technical support services by maintaining EC-related data bases and data support services for Air Force Commands, Air Force program managers, and other DoD agencies. The AFEWC directs technical studies with special interest in suppressing hostile EW systems. To assist commanders in the field, the AFEWC also studies the vulnerability of Air Force electronic systems to hostile EW attack.

- o By comparison, the JEWG mission pertains to joint matters. The JEWG provides comprehensive analytical EW support to joint military operations and provides EW technical assistance to the Secretary of Defense, the Joint Chiefs of Staff, the Unified and Specified Commands, and other Defense agencies. The EW assistance consists of EW combat analysis support to the United States Armed Forces. The EW combat analyses include conducting assessments of the capabilities and vulnerabilities of U.S. EW equipment and equipment-deployment concepts. The JEWG also provides research and study support and assists joint operation planners.

Our comparison of the two Centers showed that they were not performing unwarranted duplicative functions. The JEWG is using the AFEWC information systems to avoid duplication, and the Centers share the same Commander. Both Centers are currently undergoing a reduction-in-force effort and are further streamlining their operations. Based on our review, we concluded that there is no unwarranted duplication between the JEWG and the AFEWC.

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PART II - FINDING AND RECOMMENDATION

FREQUENCY MANAGEMENT WITHIN DoD

Management of the electromagnetic spectrum within the DoD remains fragmented despite attempts to achieve better coordination. In addition, the Joint Frequency Management Offices are not fully staffed to address management and use of the electromagnetic spectrum in the Commander-in-Chief's areas of responsibility during contingencies. As a result, the ability of the Services to operate jointly and effectively during combat contingencies can be adversely impacted.

DISCUSSION OF DETAILS

Background

The electromagnetic spectrum is the range of frequencies of electromagnetic radiation from zero to infinity. The spectrum has a wide array of users who operate a variety of equipment, such as radios, radars, satellites, space sensors, and smart weapons.

DoD Directive 4650.1, "Management and Use of the Radio Frequency Spectrum," July 24, 1987, requires that sound engineering and administrative practices be applied throughout the DoD for effective and efficient use of the electromagnetic spectrum. One function of spectrum management is to ensure that users of spectrum-dependent systems can operate their systems in their intended environment to accomplish their missions without suffering or causing unacceptable interference to other authorized users of the electromagnetic spectrum.

Spectrum Management Policy. The National Telecommunications and Information Administration (NTIA) within the Department of Commerce is responsible for overall spectrum management in the Federal Government, including the DoD located within the United States and its possessions. The NTIA established the Inter-department Radio Advisory Committee in 1922, an interagency activity with responsibility to develop and execute policy for spectrum management and review and advise on U.S. Government spectrum allocations, assignments, and policy. This policy is in the "NTIA Manual of Regulations and Procedures for Federal Radio Frequency Management."

DoD Directive 4650.1 specifies that the Assistant Secretary of Defense (Command, Control, Communications and Intelligence) is responsible for providing overall policy for managing and using the electromagnetic spectrum. This policy is represented both interdepartmentally and internationally. The Joint Chiefs of Staff (JCS) and the Assistant Secretary of Defense (Command, Control, Communications and Intelligence) are responsible for

implementing NTIA policy and providing guidance on joint and inter-Service operational military spectrum management. The JCS provides this guidance through the Military Communications-Electronics Board (MCEB).

Inter-Service coordination of DoD spectrum requirements is done through the MCEB. DoD guidance specifies that radio frequency guidance for communications-electronic systems be obtained from the MCEB early in the system acquisition. The MCEB initiates coordination with the host nation on spectrum requirements where required.

Management of the Electromagnetic Spectrum. There is no central agency managing the use of the electromagnetic spectrum within DoD. Our audit found that the management of the electromagnetic spectrum and the allocation and assignment of frequencies are managed by the Services in coordination with other agencies. Each Service has established an infrastructure responsible for implementing its own spectrum management. The Services are responsible for various spectrum management tasks, including processing requests for equipment frequency allocations and assignments.

Frequency allocation is the designation of frequency bands for use in specific functions or services. Frequency assignment is the process of designating a specific frequency for use at a particular station under specified operating conditions. The allocation and assignment processes performed by the Services are similar; however, the procedures used are different. Further, the Services have each issued policy and guidance for spectrum management (Appendix A).

In addition to the FMCs, other activities are responsible for spectrum management. For example, the DoD Area Frequency Coordinator (AFC) system is responsible for reducing interference and coordinating frequencies within its designated areas. The seven AFCs manage, coordinate, and schedule temporary use of frequencies at military test and training ranges. The Military Departments provide overall policy guidance to the AFCs. Also, a frequency manager is assigned to each CINC who is responsible for coordinating frequency assignments. In addition, frequency assignments for use outside the Continental United States are coordinated through the CINC Joint Frequency Management Office (JFMO) in whose area of responsibility the frequency will be used. FMCs are responsible to their respective Services, whereas the CINCs are responsible to the JCS. This division of responsibility in spectrum management resulted in problems in DoD managing the electromagnetic spectrum during Operation Desert Shield (Appendix B).

Another activity involved in frequency management is the ECAC. This center is a joint DoD activity established under DoD Directive 5160.57, "Electromagnetic Compatibility Analysis Center," September 23, 1966, (later incorporated into DoD

Directive 3222.3) to develop, maintain, and distribute electromagnetic compatibility data bases and electromagnetic compatibility analysis models. The ECAC is involved with the electromagnetic spectrum process because the ECAC maintains the Frequency Resource Record System (FRRS), which contains all DoD frequency assignments and is updated daily by the FMCs and others. The FRRS provides centralized record keeping, standard record structure and procedures, and data retrieval capabilities. The ECAC also supports the Services by processing frequency allocations and assignments. In addition, each Service has a liaison office at ECAC that acts as a focal point on matters affecting operations, planning, and development of spectrum-dependent systems. These personnel provide advice and assistance on electromagnetic compatibility issues, including frequency allocation and assignment questions, to Service headquarters staff, program managers, operational commanders, and other DoD Components. In summary, there are numerous offices performing frequency management functions, but there is no central management agency to coordinate all frequency efforts. See Appendix C for principal activities in the current frequency management organization.

Use of the Electromagnetic Spectrum During Operation Desert Shield. To use the spectrum successfully, all users must exchange spectrum-use information from the beginning of the joint planning process to the execution of any operation. An example of the users not exchanging spectrum information and needing a centralized management agency within DoD was evident during the initial phase of Operation Desert Shield. For example, only one frequency manager was initially assigned to the CINC JFMO to manage more than 29,000 frequency assignments. Due to the lack of personnel assigned at the CINC level to handle these frequencies and make new assignments, frequencies were also being assigned without coordination with the host nation. Frequencies were also being assigned with limited knowledge of the Components' and Allies' equipment being deployed to the theater of operations. This resulted in unacceptable equipment interference and interoperability problems. In addition, few frequency management augmentation personnel and no augmentation teams could be deployed to assist the frequency manager during Operation Desert Shield.

Other examples of the problems the Services encountered were that frequencies were assigned to equipment that was idle and inter-Service communications equipment was not compatible. As a result, the Services had problems in managing the electromagnetic spectrum during Operation Desert Shield.

Use of the electromagnetic spectrum is pervasive in military operations, in all functional areas and levels of command, often in competing ways. Thus, if electromagnetic interference reaches unacceptable levels, military forces may be unable to maximize their missions efficiently. We believe that improved

coordination of spectrum management among the Components and the CINC JFMO is needed to manage the spectrum more efficiently and effectively during contingency operations. This would occur with a centrally managed office and with frequency management augmentation teams.

Consolidation of the Frequency Management Centers. We believe there could be benefits and potential monetary savings by consolidating the FMCs. All FMCs could use the same standardized automated systems for processing frequency allocations and assignments. For example, when a new software program is selected for use, each Service could be required to use the same program. This would provide uniformity among the Services, thus enabling the sharing of the spectrum management workload. In addition, there would be an exchange of information of each Service's frequency assignments, thus reducing the potential for interference and interoperability problems. Also, with the FMCs consolidated, frequency management teams could be assembled and quickly deployed to assist the CINCs, thus providing more efficient frequency coordination, enabling the Military Departments to accomplish their missions more effectively.

Potential Savings. The potential savings cannot be fully quantified until a final organizational structure is determined. Currently, the three FMCs have a total of 83 billets with a total Operation and Maintenance estimated budget of \$4.4 million. Of the 83 billets, 20 are military and 63 are civilian. If the FMCs were consolidated, some civilian billets can be more effectively used by reducing the duplication of data base, clerical, and administrative support. Any savings associated with the consolidation would help achieve the Defense Management Report goal of streamlining management and reducing overhead costs while maintaining military strength (Appendix D).

Conclusion

The lack of a central spectrum management agency within DoD has contributed to the Services' not managing the electromagnetic spectrum as efficiently as possible during the initial phase of Operation Desert Shield. Restructuring of the DoD spectrum management infrastructure to include the major users of the spectrum and the consolidation of the FMCs into a joint spectrum management agency could improve coordination and use of the electromagnetic spectrum. In addition, frequency management augmentation by individuals or teams is needed to assist the CINCs during exercises and contingency operations. Through the consolidation of the Services' FMCs, these teams could be assembled efficiently and quickly deployed. Further, any

conclusions based on the on-going, in-depth review of the DoD's spectrum management infrastructure should be used to enhance the efficiency and effectiveness of the management and use of the electromagnetic spectrum.

RECOMMENDATION, MANAGEMENT COMMENTS, AUDIT RESPONSE

We recommend that the Deputy Secretary of Defense consolidate the Services' Frequency Management Centers into a central agency or activity with responsibility for coordinating management of the entire electromagnetic spectrum.

MANAGEMENT COMMENTS

Deputy Assistant Secretary of Defense (Defense-Wide Command, Control, Communications and Intelligence) comments. The Deputy nonconcurred with the finding and recommendation. The Deputy stated that while management of spectrum resources can be improved, a detailed analysis should be performed before any consolidation of the FMCs. Currently, the DoD is reviewing the Defense-wide spectrum management structure, applying business-process modeling tools for improving spectrum resources throughout DoD. The Deputy also indicated that the findings of our report will be taken into consideration during DoD's review and analysis. See Part IV for the complete text of the Deputy's comments.

Department of the Army, Director of Information Systems for Command, Control, Communications, and Computers comments. The Director nonconcurred with the finding and recommendation. The Army stated that the finding was inadequately researched and incorrectly developed. He felt that citing Operation Desert Shield as an example of poor coordination between the Services was incorrect. The Director's reply said that the statement "the spectrum is not being effectively managed within DOD" was unjustified because, until the IG sets a standard by which effectiveness can be measured, the finding is speculative. The Director also stated that the report distorted and confused the mission of various organizations and their specific roles in the spectrum management infrastructure.

The Director felt that the IG team "was not able to correctly differentiate between command, staff, and technical support relationships especially as they apply to spectrum management." He also stated that the recommendation should address the Joint and DoD agencies and organizations that are not doing their functions. He felt that information we quoted from a Joint Army and Air Force report, referred to in the Prior Audit Section of the draft report, was used out of context. He nonconcurred

with the potential savings stated in the draft report because an economic analysis was not done. He felt that certain definitions and descriptions were "slightly off target." For example, he disagreed with the definitions used for electronic combat, electromagnetic spectrum, frequency allocation and assignment, and the content in the appendixes. Finally, he said that the audit should have been reannounced because the original audit objectives did not apply to frequency management. See Part IV for the complete text of the Army's comments.

Department of Air Force, Deputy Chief of Staff for Command, Control, Communications, and Computers comments. The Deputy also nonconcurrented with the finding and the recommendation and had some of the same concerns that the Army stated in its response. The Air Force felt that the electromagnetic spectrum is being effectively managed and that there is effective coordination among the Services Frequency Management Centers and OSD to prevent unwarranted duplication. The Air Force felt that the numerous committees, working groups, MCEB Frequency Panels, and the OSD current interest in how the frequency management infrastructure is organized provides DoD with the necessary internal controls to prevent the unwarranted duplication of effort among the Services. The Air Force concurred that there are advantages to consolidating the FMCs, but they were not sure that ECAC should be the lead. See Part IV for the complete text of the Air Force comments.

AUDIT RESPONSE TO MANAGEMENT COMMENTS

We disagree with the Deputy Assistant Secretary's position regarding the recommendation. While we acknowledge that current evaluations of the use of the electromagnetic spectrum may lead to improved management, we believe that the consolidation of the FMCs would be the single most effective measure to improve DoD's management of the spectrum.

The intent of our recommendation was to consolidate the FMCs and streamline the frequency management process. We still feel that the consolidation of the FMCs into one agency or activity is advisable. Our original recommendation to consolidate the FMCs under ECAC was one alternative. To provide management with more options and because of the ongoing study such as the CIM initiative and upcoming revision to JCS Memorandum of Policy 64, we have changed the recommendation to read that "the FMCs be consolidated into a single agency or activity with responsibility for managing the entire spectrum." The preliminary results of the above study indicate that consolidation is now being considered. We welcome this development and believe that, in order to make the system work efficiently, consolidation under one activity must be accomplished. The revised audit recommendation will provide DoD with the flexibility to determine the most cost-effective method for the consolidation. Once the consolidation is complete, potential savings can then be determined.

We disagree with the Army's position that the finding was inadequately researched and incorrectly developed. During the audit we reviewed the various Directives, OMB Circulars, Manuals, and Publications as identified by frequency management personnel. We also interviewed personnel from MCEB and Frequency Management Centers. In our opinion, while these documents and working groups provided guidance and illustrated some coordination, it is still accurate to describe DoD management of the frequency spectrum as fragmented. However, after our audit was completed, we were provided information on the revised JCS Memorandum of Policy (MOP) 64 and the CIM initiative. Both are evaluating how to improve the spectrum management infrastructure and coordination between the Services and the Joint agencies. Because of the new efforts and the current ongoing working groups and Service coordination, the statement "there is little or no coordination" has been changed in the finding to read "...spectrum management within DoD is fragmented."

We also disagree with the Army's position that we should not use Operation Desert Shield examples to show inadequate coordination between the Services. The examples in the report are based upon interviews with United States Central Command (USCENTCOM) personnel responsible for frequency management functions. There was only one frequency manager responsible for coordinating more than 29,000 frequencies. Further, due to the lack of spectrum management personnel assigned to the CINC and a lack of frequency management augmentation teams to assist the frequency manager, it was several weeks before a deployment team could help CENTCOM manage the spectrum and make new assignments. Because deployment teams were not established before the beginning of the conflict, assistance could not be provided in a timely manner. Further, a data base had to be created to track frequency assignment actions. We agree that the USCENTCOM JFMO was responsible for coordinating the equipment being used in theater and that there was a shortage of JFMO-level personnel to handle spectrum management functions. However, we believe that if the FMCs consolidate, deployment teams could be established and could be readily available to assist the CINC's during wartime.

The Army felt our statement that "the spectrum is not being effectively managed within DoD" was speculative and unjustified because there is no standard by which effectiveness can be measured. We agree that no standard by which effectiveness for spectrum management can be readily or precisely measured was found during our review. Nevertheless, we found evidence of significant coordination problems related to fragmented management. We have reworded the finding and discussion in this final report, but the thrust of our conclusions remains the same.

The Army assessment that the draft report distorted and confused the mission of various organizations and their roles in the spectrum management infrastructure is wrong. The documented information used to describe the infrastructure was derived from

various sources including the MCEB, FMC, DoD Area and Facility Coordinators, and CINC JFMO personnel. In addition, we reviewed and analyzed various DoD Directives that addressed the functions and responsibilities of the MCEB and the management and use of the Radio Frequency Spectrum. For example, we reviewed Army Regulation 5-12 which addresses the Army's functions and responsibilities with respect to the management of the electromagnetic spectrum. While we realize that the spectrum management organizations perform complementary functions, no single agency has responsibility for all organizations involved.

We disagree with the Army implication that centralized management was already in place and that the recommendation was flawed and should address only the Joint agencies. Frequency management problems encountered during Operation Desert Shield occurred in each of the Services, not just at the Joint level. In view of the problems encountered during Operation Desert Shield, some form of centralized spectrum management is needed within DoD. Centralized management as presented in the audit report would constitute a single spectrum management agency or activity that would include the Services' FMCs and the CINC's JFMO. During Desert Shield, in contrast, each Service had a Frequency Management Center responsible to perform spectrum management functions for its respective Service. In addition, the CINCs had Frequency Management Offices which were responsible for making both permanent and temporary assignments in their areas of responsibility. Further, the Area Frequency Coordinators were responsible to manage, coordinate, and schedule temporary use of frequencies at military test and training ranges. In summary, various activities were involved in spectrum management; however, no central authority was coordinating those efforts.

We disagree that information taken from a Joint Army and Air Force report was out of context. The 1989 Joint Air Force-Army Report, "Radio Spectrum Management in Joint Tactical Operations," stated that "the Army lacked a defined central authority for all aspects of frequency management." In addition, "the Army frequency manager had a very limited role in addressing the wartime frequency management process." It also stated that there was a need for a single office or agency to act as a focal point to resolve Electronic Combat issues.

With respect to the Army nonconcurring with our estimated potential savings, we still believe that monetary benefits can be gained by consolidating the FMCs regardless of how the new agency is organized. Our original recommendation stated that the FMCs should be consolidated and placed under ECAC. We estimated that this could save approximately \$2 million. We believe that in a consolidated environment, there would be greater emphasis on standardizing data automation and exchanging information concerning equipment and new technology. Also, interference problems should be identified early in the development process and, therefore, be resolved in a timely manner. The OSD is currently making an in-depth review of electromagnetic spectrum

use and current organizational structure. Accordingly, we have revised our recommendation to state that the FMCs should be consolidated, but without specifying exactly how that should be done.

We do not believe that our definitions and descriptions are misleading. They are general in nature and provide a necessary overview. In describing the allocation and assignment processes outlined in Appendix A, we provided a summary of the basic steps in processing frequency allocations and assignments. In addition, the description of the Army Frequency Management Center in Appendix B provides an overview of the functions and responsibilities of the Center. These definitions and descriptions were not intended to be Service specific; however, where necessary, we have added wording which should clear up any misconceptions the Army may have. Concerning the alleged redirection of the audit, frequency management is a part of the electronic combat area and reannouncing the audit was not necessary.

We disagree with the Air Force, which felt that there was effective coordination and that the spectrum was being effectively managed. As stated in our response to the Army, we still believe that there is a need for more centralized frequency management. We agree that the Services have taken steps to prevent unwarranted duplication, but more should be done.

The Air Force also nonconcurred with the draft recommendation that the Service FMCs should go under ECAC. As previously stated, we have reworded the recommendation.

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PART III- ADDITIONAL INFORMATION

- APPENDIX A - Description of Allocation and Assignment Processes
- APPENDIX B - Description of Military Departments' Frequency Management Centers
- APPENDIX C - Frequency Management Organization
- APPENDIX D - Summary of Potential Benefits Resulting From Audit
- APPENDIX E - Activities Visited or Contacted
- APPENDIX F - Report Distribution

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APPENDIX A - DESCRIPTION OF THE ALLOCATION AND ASSIGNMENT PROCESSES

Frequency Allocation. Frequency allocation is the designation of frequency bands for use in performing specific functions or services. The DoD spectrum management community accomplishes frequency allocation through what is called the J-12 Process. The mechanism for activating this process is the DD Form 1494, Application for Equipment Frequency Allocation.

The DoD J-12 Working Group is the coordinating body within DoD for ruling upon DD Form 1494 applications and providing frequency supportability through coordination with host nations where the equipment will be employed. The DoD J-12 Working Group reviews and drafts MCEB guidance during each phase of the equipment's acquisition life cycle. This ensures that spectrum compatibility is designed into the system. The DoD J-12 Working Group is assisted in its technical review by ECAC who performs an electromagnetic compatibility analysis report for each system, based upon its operating parameters and its intended employment location. Approved DD Form 1494s are prepared by the DoD J-12 Working Group for formal issuance by the USMCEB.

Major DoD systems outside of the 225-400 MHZ frequency band that are intended for use in the United States and its Possessions and all satellite systems are required to be coordinated with the NTIA's Spectrum Planning Subcommittee (SPS). All DoD Services are represented on the SPS, which makes recommendations to the NTIA administrator on applications, performs future spectrum planning, performs preparatory work for international conferences, and conducts studies to ensure the optimum placement of radio services to make maximum effective use of the spectrum. This timeline for the frequency allocation process is driven by mission need.

Frequency Assignment. The frequency assignment process includes those actions involved in granting authority to operate a transmitter on a discrete frequency at a particular location under specified technical parameters as delineated within the assignment authority. Authority over radio frequencies within the United States and Possessions is divided between the Congress and the President. The President, by Executive Order, has delegated to the NTIA the authority to assign frequencies to Federal Government Agencies.

The Interdepartmental Radio Advisory Committee serves in an advisory capacity to the NTIA to assist in assigning frequencies and developing policies, programs, procedures and technical criteria pertaining to the management and use of the spectrum. Outside the United States and Possessions, unified commanders control the use of frequencies assigned to U.S. military users

**APPENDIX A - DESCRIPTION OF THE ALLOCATION AND ASSIGNMENT
PROCESSES** (Continued)

operating within their areas of responsibility. In peacetime, the U.S. military forces within foreign countries have no independent authority to use radio frequencies and are dependent upon existing agreements or coordination with appropriate national administrations. Each Military Department decides (noting policies, rules, regulations, frequency allocations, and frequency availability) whether, what, and how many mission requirements can be fulfilled by using military communications-electronics systems. Each Military Department makes the necessary technical studies, selects proposed frequencies, coordinates with other involved agencies, and prepares and files an application with NTIA, Office of Spectrum Management, Frequency Assignment Branch, for consideration by the Frequency Assignment Subcommittee of the Interdepartmental Radio Advisory Committee for those applications within the United States and Possessions.

Military use of the spectrum is based on extensive sharing since no exclusive radio frequencies are allocated specifically to satisfy military communications-electronic systems. A user determines operational frequency requirements necessary to perform a mission and forwards this requirement through the respective Military Department chain of command. Each level is assigned certain responsibilities to verify technical accuracy, completeness, and justified need of the application. Each Military Department forwards the validated frequency applications to the Electromagnetic Compatibility Analysis Center (ECAC). ECAC edits and converts the required technical data to the national-level format for NTIA processing. Automated NTIA processing takes 15 work days from receipt to authorization unless the application does not meet technical criteria. Once approved nationally, ECAC notifies the user of assignment approval through message traffic.

APPENDIX B - DESCRIPTION OF THE MILITARY DEPARTMENTS' FREQUENCY MANAGEMENT CENTERS

Army Frequency Management Center. The Army's spectrum management program is divided between the Communications Electronics Services Office (CESO) and the Communications Electronics Command (CECOM). The CESO is responsible for frequency allotments and processing assignments. The CECOM is responsible for processing frequency allocations. This division of frequency management is a result of the Army's decentralization of spectrum management. Army frequency management personnel stated that the Army Spectrum Manager was not always informed of new frequency assignments.

The CECOM also tasked ECAC to provide Army frequency allocation support. This support includes verifying and completing applications for allocations. This tasking resulted because of the lack of personnel dedicated to processing frequency allocations at CECOM. The Army's frequency allocation process is not automated. However, CECOM is currently deciding whether to utilize the Navy's or ECAC's automated system.

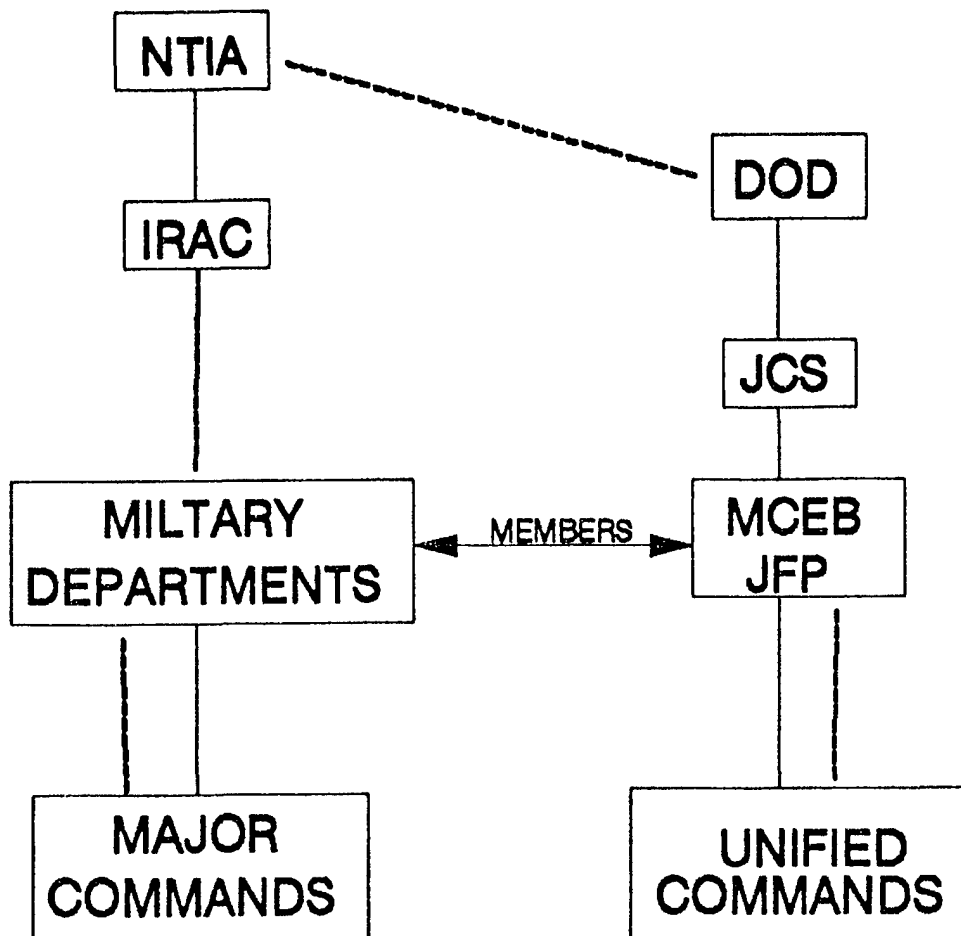
Naval Electromagnetic Spectrum Center (NAVEMSCEN). NAVEMSCEN has authority to exercise Department of Navy management and assignment of joint, national, and international spectrum management matters. The NAVEMSCEN reviews, coordinates, and secures approval of all applications for frequency allocations and assignments. The Navy has established the Navy Allocation Automation System and the Frequency Assignment Automation System to process allocations and assignments effectively. In conjunction with NAVEMSCEN, Joint Frequency Management Centers assist NAVEMSCEN in performing frequency management functions. These offices support the Navy's Commander-in-Chief for fleet operations. The Joint Frequency Management Centers are responsible for controlling, coordinating, and assigning frequencies in their geographical areas.

In addition to NAVEMSCEN, the Chief of Naval Operations provides funds to the Space and Naval Warfare Command to perform preliminary reviews of frequency allocations applications. Due to a lack of personnel, the Space and Naval Warfare Command has tasked ECAC to review allocation applications for technical accuracy and completeness of data.

APPENDIX B - DESCRIPTIONS OF MILITARY DEPARTMENTS'
FREQUENCY MANAGEMENT CENTERS (Continued)

Air Force Frequency Management Agency. The Agency is responsible for implementing the Air Force's use of the radio frequency electromagnetic spectrum. The Agency addresses all aspects of the Air Force's management and use of the spectrum. It develops and implements Air Force procedures pertaining to frequency spectrum management and use on a national, international, and government-to-government basis within the scope of established rules and regulations, as well as bilateral and international agreements. Agency personnel represent, advocate, and defend Air Force interests concerning a variety of spectrum issues and policy matters at the Department, CINC, DoD, national, and international levels. They also review and coordinate all Service, DoD, and other Federal Department and Agency requests for equipment frequency allocations and assignments. The Agency is directly responsible to Headquarters, United States Air Force, for the day-to-day management of all radio frequency spectrum-related matters on behalf of the Air Force. The Air Force has established an automated system to process allocations and assignments.

APPENDIX C - FREQUENCY MANAGEMENT ORGANIZATION



LEGEND

----- Channels for Frequency Requirements in U.S. and Possessions
----- Command or Authority Lines

NTIA.....National Telecommunications and Information Administration
IRAC.....Inter-department Radio Advisory Committee
JFP.....Joint Frequency Panel
JCS.....Joint Chiefs of Staff
MCEB.....Military Communications Electronics Board

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APPENDIX D - SUMMARY OF POTENTIAL BENEFITS RESULTING FROM AUDIT

<u>Recommendation</u> <u>Reference</u>	<u>Description of Benefit</u>	<u>Type of Benefit</u>
1.	Economy and Efficiency. Will provide OSD oversight to ensure that resources are used effectively and economically.	Undeterminable until consoli- dation occurs.

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APPENDIX E - ACTIVITIES VISITED OR CONTACTED

Office of the Secretary of Defense

Assistant Secretary of Defense (Command, Control, Communications and Intelligence), Washington, DC
Deputy Assistant Secretary of Defense (Defense-Wide Command, Control, and Communications), Washington, DC

Office of the Joint Staff

Electromagnetic Compatibility Analysis Center, Annapolis, MD
Joint Electronic Warfare Center, San Antonio, TX

Department of the Army

Director of Information System for Command, Control, Communications, & Computers, Washington, DC
Assistant Secretary of the Army, Research, Development and Acquisition, Washington, DC
Information Security Command, Ft. Huachuca, AZ
Electronic Warfare/Reconnaissance, Surveillance, and Target Acquisition Directorate, Ft. Monmouth, NJ
Signal Warfare Directorate, Warrenton, VA
Aberdeen Proving Grounds, Aberdeen, MD
Electromagnetic Environmental Test Facility, Ft. Huachuca, AZ
Army Communications, Electronic Services Office, Alexandria, VA
Army Air Defense Artillery School, Ft. Bliss, TX
Harry Diamond Laboratory, Adelphi, MD
Vulnerability Assessment Laboratory, White Sands, NM

Department of the Navy

Chief of Naval Operations, Washington, DC
Naval Sea Systems Command, Washington, DC
Naval Air Warfare Center (Weapons Division), Point Mugu, CA
Naval Air Warfare Center (Electronic Combat Range), China Lake, CA
Naval Electromagnetic Spectrum Center, Washington, DC
Navy Command, Control and Ocean Surveillance Center, San Diego, CA
Naval Surface Warfare Center, Dahlgren, VA
Naval Research Laboratory, Washington, DC
Center for Naval Analyses, Alexandria, VA

APPENDIX E - ACTIVITIES VISITED OR CONTACTED (Continued)

Department of the Air Force

Deputy Chief of Staff, Command, Control, Communications and
Computers, Washington, DC
Deputy Chief of Staff, Plans and Operations, Washington, DC
Air Force Electronic Warfare Center, San Antonio, TX
Air Force Frequency Management Agency, Washington, DC

APPENDIX F - REPORT DISTRIBUTION

Office of the Secretary of Defense

Deputy Secretary of Defense, Washington, DC
Assistant Secretary of Defense (Command, Control, Communications
and Intelligence), Washington, DC
Deputy Assistant Secretary of Defense (Defense-Wide
Command, Control and Communication), Washington, DC

Office of the Joint Staff

Director, Joint Staff, Washington, DC
Electromagnetic Compatibility Analysis Center, Annapolis, MD
Joint Electronic Warfare Center, San Antonio, TX

Department of the Army

Secretary of the Army, Washington, DC
Director of Information System for Command, Control,
Communications, & Computers, Washington, DC
Inspector General, Department of the Army, Washington, DC
Information Systems Command, Ft. Huachuca, AZ
Electronic Warfare/Reconnaissance, Surveillance, and Target
Acquisition Directorate, Ft. Monmouth, NJ
Electromagnetic Environmental Test Facility, Ft. Huachuca, AZ
Army Communications, Electronic Services Office,
Alexandria, VA

Department of the Navy

Secretary of the Navy, Washington, DC
Assistant Secretary of the Navy (Financial Management),
Washington, DC
Chief of Naval Operations, Washington, DC
Naval Electromagnetic Spectrum Center, Washington, DC

Department of the Air Force

Secretary of the Air Force, Washington, DC
Assistant Secretary of the Air Force (Financial Management
and Comptroller)
Deputy Chief of Staff, Command, Control, Communications, and
Computers, Washington, DC
Air Force Electronic Warfare Center, San Antonio, TX
Air Force Frequency Management Agency, Washington, DC

APPENDIX F - REPORT DISTRIBUTION (Continued)

Non-DoD Activities

Office of Management and Budget
U.S. General Accounting Office, National Security and
International Affairs Division, Technical Information
Center

Chairman and Ranking Minority Member of the following
Congressional Committees and Subcommittees:

- Senate Committee on Appropriations
- Senate Subcommittee on Defense, Committee on Appropriations
- Senate Committee on Armed Services
- Senate Committee on Governmental Affairs
- House Committee on Appropriations
- House Subcommittee on Defense, Committee on Appropriations
- House Committee on Appropriations
- House Committee on Government Operations
- House Subcommittee on Legislation and National Security,
Committee on Government Operations

PART IV - MANAGEMENT COMMENTS

Office of the Secretary of Defense

Department of the Army

Department of the Air Force

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Office of the Secretary of Defense



COMMAND, CONTROL,
COMMUNICATIONS
AND INTELLIGENCE

OFFICE OF THE ASSISTANT SECRETARY OF DEFENSE

WASHINGTON, DC 20301-3040

29 DEC 1992

MEMORANDUM FOR ASSISTANT INSPECTOR GENERAL FOR AUDITING OFFICE OF THE DOD INSPECTOR GENERAL


SUBJECT. Draft Audit Report of DOD's Evaluation and Analysis of Electronic Combat (Project No 2AB-0024)

In response to your memorandum of October 22, 1992 to the ASD (C3I) requesting review and comments on the Draft Audit Report of DOD's Evaluation and Analysis of Electronic Combat, the following comments are offered.

This office non-concurs with the report's conclusion that the lack of centralized spectrum management within DOD has contributed to the Services' ineffective use of the electromagnetic spectrum. The Department recognizes that there are always opportunities to improve the management of its critical resources, however, consolidating for consolidation's sake may not be the best management and economical solution without a detailed analysis. Because of Desert Storm lessons learned, the JCS C4I for the Warrior concept and the evolving Joint Task Force (JTF) warfighting doctrine, the Joint Staff in coordination with this office, initiated an indepth review of the electromagnetic spectrum use and organizational functions and responsibilities in joint military operations which will result in a rewrite of JCS Memorandum of Policy (MOP) 64. Additionally, this office is presently reviewing the Defense-wide spectrum management infrastructure using business process modeling tools for improving spectrum policy implementation and management of the spectrum resources throughout the Department. This review is being conducted with the full participation of the Military Departments, Joint/CINC Staffs, and appropriate Defense Agencies to ensure that the unique mission requirements are satisfied at all levels of command. While the savings of the draft IG report can not be substantiated, the findings of the report will be taken into consideration during our review and analysis.

In view of the fact that the Military Departments have also non-concurred with the findings and recommendations of the subject report, recommend the report be rewritten to reflect accurately the spectrum management activities within the Department and the ongoing actions to improve the overall management of the spectrum resources. This office appreciates the opportunity to comment on the draft report and stands ready to assist in the rewrite.

The OASD (C3I) staff point of contact for this action is Ms. Cindy Raiford, (703) 756-4991.


John G. Grimes
Deputy Assistant Secretary of Defense
(Defense-Wide C3)

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Department of the Army



Office, Director of Information
Systems for Command, Control,
Communications, & Computers

DEPARTMENT OF THE ARMY
OFFICE OF THE SECRETARY OF THE ARMY
WASHINGTON, DC 20310-0107

22 December 1992

SAIS-ZA

MEMORANDUM FOR THE ASSISTANT INSPECTOR GENERAL FOR AUDITING,
OFFICE OF THE INSPECTOR GENERAL

SUBJECT: DOD(IG) Draft Audit Report, "DOD's Evaluation and
Analysis of Electronic Combat" (Project No. 2AB-0024)

The Army nonconcurs with the subject report because it concludes that the radio spectrum management structures of the Military Services should be consolidated in a single new organization without addressing mission responsibilities. Management of the radio spectrum requires expertise in Army operations and doctrine. The process must define frequency support critical to the Army mission, frequency requirements of equipment to support that mission, and provide responsive support to tactical commanders. The draft audit is incomplete in this respect.

Available frequency resources for essential Army operations and training indeed justify inspection and all possible improvements in today's environment of congestion and inroads. I am willing to assist in such detailed investigations, or rewrites of the findings in the draft audit as you may desire.

If you need further assistance, the Army point of contact is Mr. E. J. Holliman, the Army Spectrum Manager, who will provide detailed comments and suggestions to the draft. He may be contacted at commercial (703) 695-3533.

A handwritten signature in black ink, appearing to read "Peter A. Kind".

PETER A. KIND
Lieutenant General, GS
Director

Enclosures

CF:
DAIG

**Final Report
Reference**

5, Para. 1

**ARMY MANAGEMENT COMMENTS
ON
DRAFT AUDIT REPORT ON DOD'S EVALUATION
AND ANALYSIS OF ELECTRONIC COMBAT**

PROJECT NO 2AB-0024

PART II - FINDING AND RECOMMENDATION

Frequency Management within DOD.

MANAGEMENT COMMENTS: NONCONCUR

1. Army position is that adequate policy and proper management structure exist but sufficient resources and skilled personnel are not allocated within the Joint Arena to effectively perform requisite function and tasks associated with the use of the spectrum in joint military operations normally conducted outside the territorial borders of the United States and its Possessions (US&P). Use of the spectrum by the Services to support departmental missions is separate from spectrum use by Army units deployed to the CINC's theater.

2. The Army nonconcur with the findings which have been inadequately researched and incorrectly developed. Your assessment is based on two derived facts; no centralized management and lack of coordination. Logic and rational for "... not being effectively managed within DoD." is based on "... no centralized management of the spectrum within DoD and there is little or no coordination between the Services' Frequency Management Centers." Centralized management is effected through the promulgation of policy and assignment of responsibilities currently contained in several DoD Directives, OMB Circular, NTIA Manual, and Joint Publications. Responsibilities of Service Departments and Joint Commanders are well delineated in these documents and performed daily. Furthermore, centralized management in the joint arena is accomplished through the auspices of the MCEB Frequency Panel Charter, as noted in the MCEB Pub 1. The various working groups of the Joint Frequency panel are chartered primarily to coordinate radio frequency management actions, yet finding states "little or no coordination". Additionally, the Services work very closely in coordinating military positions on regulatory matters of mutual concern at the NTIA Interdepartment Radio Advisory Committee (IRAC) and its numerous permanent subcommittees, Ad Hoc Groups and groups. A more thorough research of existing documents will clearly show that the real facts strongly contradict the conclusion and finding of this audit report.

3. Using the example of Desert Storm as a justification to point out there was little or no coordination between the Services demonstrates a lack of understanding of joint organizational structure and inability to correctly analyze contributing factors to the spectrum management problems during Desert Storm. During the onset of Operation Desert Shield JFMO CENTCOM had only one E-7. During a meeting with the DoD IG team on 25 November 1992,

Mr. Simpson had correctly made the observation that the JFMO offices were inadequately staffed but did not want to pursue that logic in the draft report. To conclude that problems in Desert Shield were coordinating problem among the Services is absolutely incorrect. The Joint Staff has acknowledged the staffing deficiencies with the JFMO by promulgating CJCS MOP 64, Electromagnetic Spectrum Use in Joint Military Operations. This MOP stresses the importance of spectrum management and assigns appropriate spectrum management responsibilities to the CINC staff elements. A copy of MOP 64 is enclosed as Enclosure 1. Its success has already been demonstrated in JCS Exercise INTRINSIC ACTION and Operation PROVIDE HOPE.

4. The strong statement, "... not being effectively managed within DoD." is unqualified and lacks any rational performance measurement to reach this finding. Statement is mostly speculative and without substantiated facts. DoD IG needs to provide a rational standard by which it is measuring effectiveness of spectrum management. Until standards can be established we are unable to provide the correct information. The Army is willing to provide additional information upon release of their standard.

5. The report often distorts and confuses the mission of various organizations and their specific roles in spectrum management infrastructure. It appears that the team was not able to correctly differentiate between command, staff, and technical support relationships especially as they apply to spectrum management. A concept which the Army repeatedly tried to convey to the DoD IG team is the military commander with a geographical area of responsibility is the controlling authority for spectrum allotted or delegated for his use. This underlying principle is contained throughout the publication cited earlier yet was not adequately documented in the report. Consequently, the command and support responsibilities of the various organizations involved with spectrum management from the US government department level to the frequency user at the lowest level is not properly understood and articulated. The report simply makes a conclusion "there is no centralized manager to coordinate all frequency efforts."

6. Statements in this finding further imply that the only function spectrum management conducts is only processing function. Each Service requires an organic staffing capability to represent, advocate, defend, negotiate, develop, prioritize and decide its spectrum utilization. The Communications Act of 1934, established the IRAC forum for the national government agencies with the Services, Army, Navy, and later the Air Force to support their requirements. Forums in the International, Allied and Joint exist to coordinate, defend and represent the Services. The finding further confuses the management aspects by including other activities responsible for spectrum management, e.g., DoD Area Frequency Coordinator, a frequency manager assigned to the CINCs, and ECAC. The missions and functions are different and compliment each other. The different organizations do not duplicate functions; the organizations, in fact, are integral and separate parts of the entire DoD spectrum management

infrastructure and compliment each other.

7. From the context of different mission and functions of the different organizations with policies, directives and regulations from international, national, allied, joint and services, it is not clear what centralized management is defined as by the audit report. Conclusion is off target when a general statement such as "...but there is no centralized manager to coordinate all frequency efforts." Centralized management for the different functional aspects of spectrum management are conducted and managed at the respective organizational echelon and culminating at the international and national level.

8. If indeed, the audit is making a strong statement that there is no centralized management, as it applies to OSD only, then the focus of the recommendations is flawed and incorrect. The recommendation should then address the joint and DoD agencies and organizations that are not doing the functions, alleged duplication of functions and consolidating at that joint level to establish and sustain centralized management at the joint level.

Recommendation: . Audit team review and collect accurate data and information and ensure understanding of the different mission and functions. Define what centralized management means in terms of missions and functions and how centralized management is related to these functions. Review the functions of the MCEB, CINC, operational aspects of warfighting and reevaluate and refocus on what and where is the deficiency or problem concerning lack of coordination. Delete the statements; findings are speculative and are not substantiated.

**Final Report
Reference**

8, Para. 3

**ARMY MANAGEMENT COMMENTS
ON
DRAFT AUDIT REPORT ON DOD'S EVALUATION
AND ANALYSIS OF ELECTRONIC COMBAT**

PROJECT NO 2AB-0024

PART II - FINDING AND RECOMMENDATION

Potential Savings

MANAGEMENT COMMENTS: Nonconcur.

1. Army position is there is no substantiative evidence or economic analysis to conclude such a saving. Finding is completely speculative, even with the wording "potential saving". Actual facts, missions and responsibilities, and work loads do not support the conclusion.

2. Audit does not articulate the specifics of the rationale or details of how the 28 civilian billets were determined to be eliminated, except to note that this figure was derived by looking at the organization charts and determining the number of people assigned to processing frequency allocations and assignments. It may be unwarranted to provide comments and speculation on a not substantiated speculation.

3. Audit report does not provide information concerning their interpretation of what duplication of data base support, clerical, and administrative positions they are referring to. All Army positions to process allocations and assignments are not administrative or clerical positions. Allocation positions are engineers and assignment personnel are communications specialists. Mr. Simpson informed the Army that the Army had 4 slots out of the 28 slots being eliminated. The Army position is that the Army's slots are not administrative, clerical or duplicates database support, consequently, the Army should not have any slots being eliminated. It is very difficult to provide comments concerning the alleged Army slots to be eliminated without the benefit of the details of the analysis. The Army is willing to provide and discuss the elimination issue in more detail upon the details being provided.

4. The audit team appears to have misinterpreted and incorrectly analyzed the duplication of data base support, clerical and administrative support. The Services and the CINCs all use the same database, resident at ECAC. Each respective entity maintains and is responsible for their respective data bases. This does not mean duplication of data base support, clerical or administrative support. Lack of process understanding and depth results in totally incorrect conclusions and findings. It is not clear as to what the duplication the audit report is referring to.

5. It is the Army's estimate that it would increase in cost to accomplish those functions deleted by the elimination of the 28 billets. The work load does not disappear but remains a sustained workload. Functions and work load will continue and must be accomplished. Contracting the workload out becomes more expensive in the long term vis-a-vis alleged savings. Eliminating the slots for allocation and assignments increases the workload on the already overloaded personnel. Furthermore, a greater problem is the long term problem of shifting the expertise outside of the government channel and become dependent on someone else to conduct and complete the workload.

6. The audit's assumption is that ECAC can reduce expenses by eliminating the distribution of the FRRS update. It is not clear from the audit's report of how this result was obtained. The FRRS is an automated system and the updates are done electronically, consequently, the savings from eliminating distribution from consolidation is unfounded and does not make logical, financial sense.

**Final Report
Reference**

**ARMY MANAGEMENT COMMENTS
ON
DRAFT AUDIT REPORT ON DOD'S EVALUATION
AND ANALYSIS OF ELECTRONIC COMBAT**

PROJECT NO 2AB-0024

**MANAGEMENT COMMENTS ON OVERALL ACCURACY AND QUALITY OF AUDIT
REPORT**

The report contains many statements which are factually incorrect and uses spectrum management terminology completely out of context. The improper use of the facts combined with a lack of understanding of the physics of the electromagnetic spectrum as well as the management structure has produced wrong conclusions and findings which are illogically developed. The overall quality of the report is best characterized as sophomoric. The following examples are case in point.

1, Para. 1

1. Source of electronic combat definition, page 1, from the audit is unknown. Audit definition is not consistent with JCS Pub 1 or any other know source of definition.

1, Para. 1

2. Definition of electromagnetic spectrum, page 2, is misleading and not clear on what is the intent of the definition.

3. Source of electromagnetic spectrum definition from the audit is unknown. Audit definition is not consistent with NTIA, JCS Pub or any service reference.

6, Para. 4

4. Source of frequency allocation definition from the audit is unknown and poorly written, e.g., page 9, "Frequency allocation is the certification that the radio frequency required for the system is available."

6, Para. 4

5. Source of frequency assignment definition, page 9, should be consistent with the NTIA or JCS Pub definition.

6. "Other factors that limits effective management,... equipment without coordination among the services and host nation resulting in jamming, interference and interoperability.", shows poor understanding of responsibilities, functions and operations by making a statement that is inaccurate and wrong. Jamming is not a result of lack of coordination among services or host nation. By definition, jamming is something entirely different. Interoperability problems is misleading and technically out of context. Technically and operationally, it is not clear what point is being made, furthermore, it is irrelevant to the problems noted.

7. There was a centralized management office during Operation Desert Shield/Storm. CENTCOM with ECAC in support was

**Final Report
Reference**

- the centralized management. Logic of lack of frequency management teams resulted in frequencies being assigned without coordination should be directly attributed to CENTCOM and ECAC.
- 17, Para. 1 8. Services being assigned frequencies for equipment that was not being utilized resulting in services having problems during Operations Desert Shield/Storm resulting in problems is misleading and incorrect. Conclusion is incorrect. The Army did not have problems in managing the radio frequency spectrum during Operations Desert Shield. The problem was the management, philosophy, procedures, and tactics at CENTCOM in support of the Services.
- 19, Para. 1 9. Appendix A - Description of the Allocation and Assignment Processes. What is the source of these processes? "Facts" in each of the processes are slightly off target and consequently, provides incorrect assumptions and faulty results.
- 21, Chart 10. Appendix B - Description of the Military Departments' Frequency Management Centers. Army Description is incorrect. It would be easier for the audit team to rewrite the Army portion than to provide comments to each portion of the description. Description provides a cursory view and elementary perspective with different processes and procedures confused and leads a reader to false assumptions and conclusions.
- 23, Para. 1 11. Appendix C - Frequency Management Organization. Diagram is incorrect in organizational structure, responsibilities, and functions. It is not clear as to what function or structure the audit team is attempting to construct. Recommend they contact the Army office to correctly put the organizational structure to the desired function.
- 25, Para. 1 12. Appendix D - Summary of Potential Benefits Resulting from Audit. This is a summary that is speculative and does not provide any substantiated facts to show potential savings. Appendix serves no purpose and logic and analysis are based on faulty and flawed facts.
- 27, Para. 1 13. Appendix E - Activities Visited or Contacted. Quality of report is questioned when the senior Army Spectrum Manager, centralized at Headquarters Department of the Army is conspicuously, left out of the activities contacted. The Army Spectrum Manager is the functional chief of this area of responsibility and was one of the first contacted by the audit team, yet not even acknowledged as an activity visited.
14. Appendix F - Report Distribution. The DISC4 is the Army proponent responsible for spectrum management and not part of the address list. Distribution is based on subject of the audit, Electronic Combat, consequently, frequency management organizations will not receive a copy of the audit report and would not have had the opportunity to comment.
- Recommendation.** Use correct references and rewrite report to reflect correct definitions and ensure facts are use in the correct context.

ARMY MANAGEMENT COMMENTS
ON
DRAFT AUDIT REPORT ON DOD'S EVALUATION
AND ANALYSIS OF ELECTRONIC COMBAT

PROJECT NO 2AB-0024

MANAGEMENT COMMENTS ON FOCUS OF THE PROBLEM AND RECOMMENDATION FOR
SUBSEQUENT AUDIT

1. Your analysis lacks insight and clear understanding of missions and responsibilities. Your lack of understanding of the JCS, MCEB, CINC, OSD and Service structure creates incorrect statements, false conclusions, and irrelevant facts. Your assessment is based on two derived facts; no centralized management and lack of coordination.

2. Management of the Spectrum findings combines, confuses, and mixes up the many functions and responsibilities from the US government department level to the frequency manager at the lowest level and simply makes a conclusion that "there is no centralized manager to coordinate all frequency efforts." Statements in this finding intends to make the point that the only function spectrum management does is a processing function. The Services represents, advocates, defends, negotiates, develops and satisfies the Services spectrum requirements. The Communications Act of 1934, established the IRAC forum for the national government agencies with the Services, Army, Navy, and later the Air Force to support their requirements. Forums in the International, Allied and Joint exist to coordinate, defend and represent the Services. The finding further confuses the management aspects by including other activities responsible for spectrum management, e.g., DoD Area Frequency Coordinator, a frequency manager assigned to the CINCs, and ECAC. The missions and functions are different and compliments each other. The different organizations do not duplicate functions; the organizations, in fact, compliments each other.

From the context of different mission and functions of the different organizations with policies, directives and regulations from international, national, allied, joint and services, it is not clear what centralized management is defined as by the audit report. Conclusion is off target when a general statement such as "...but there is no centralized manager to coordinate all frequency efforts." Centralized management for the different functional aspects of spectrum management are conducted and managed at the respective organizational echelon and culminating at the international and national level.

Recommendation: Audit team review and collect accurate data and information and ensure understanding of the different mission and functions. Define what centralized management means in terms of missions and functions and how centralized management is related to these functions.

3. Lack of Coordination. All of the examples noted in the finding focuses on the deficiencies at the CINC and joint Force levels. Coordination occurs among the services and allied forces all the time and must be centrally managed at the CINC/JTF level. Host nation coordination is a CINC responsibility. If the conclusion is that coordination among services is needed to manage the spectrum more effectively during contingency operations than the central focus of this issue is the CINC or JCS. Command and control of a joint fighting force including the use of the spectrum to support the military objectives is the responsibility of the CINC and his staff.

Recommendation: Review the functions of the MCEB, CINC, operational aspects of warfighting and reevaluate and refocus on what and where is the deficiency or problem concerning lack of coordination.

**Final Report
Reference**

6, Para. 3

**ARMY MANAGEMENT COMMENTS
ON
DRAFT AUDIT REPORT ON DOD'S EVALUATION
AND ANALYSIS OF ELECTRONIC COMBAT**

PROJECT NO 2AB-0024

PART II - FINDING AND RECOMMENDATION

Management of the Electromagnetic Spectrum.

MANAGEMENT COMMENTS: Nonconcur.

1. The Army position is that the audit provides a cursory view of the various organizational echelons responsibilities and functions and makes a general conclusion that is out of context and a naive review of complimentary vis-a-vis duplicative functions.

2. Management of the Spectrum findings combines, confuses, and mixes up the many functions and responsibilities from the US government department level to the frequency manager at the lowest level and simply makes a conclusion that "there is no centralized manager to coordinate all frequency efforts." Statements in this finding intends to make the point that the only function spectrum management does is a processing function. This is a shallow analysis and far from the truth. Services represents, advocates, defends, negotiates, develops and satisfies the Services spectrum requirements. The Communications Act of 1934, established the IRAC forum for the national government agencies with the Services, Army, Navy, and later the Air Force to support their requirements. Forums in the International, Allied and Joint exist to coordinate, defend and represent the Services. The finding further confuses the management aspects by including other activities responsible for spectrum management, e.g., DoD Area Frequency Coordinator, a frequency manager assigned to the CINCs, and ECAC. The missions and functions are different and complements each other. The different organizations do not duplicate functions; the organizations, in fact, complements each other.

3. Centralized management to coordinate all frequency efforts within a specific organization or echelon are conducted at the APC, CINC, Services, MCEB, national, allied and international levels, consequently, the statement requires clarification. The misunderstanding is from the assumption that all and every little detailed requires centralized management. What the audit report failed to recognize is the management concept of centralized management with decentralized execution. Decentralized execution centralizes the spectrum management efforts at that specific echelon or organization. This is not duplication. It is the Army's position that this is an unfounded summary and conclusion.

**Final Report
Reference**

Deleted

**ARMY MANAGEMENT COMMENTS
ON
DRAFT AUDIT REPORT ON DOD'S EVALUATION
AND ANALYSIS OF ELECTRONIC COMBAT**

PROJECT NO 2AB-0024

PART II - FINDING AND RECOMMENDATION

Lack of Coordination

MANAGEMENT COMMENTS: Nonconcur.

1. The Army position is that the audit facts are incorrect and consequently, the basis for the conclusion is flawed.

2. The facts used from Desert Storm is grossly in error and incorrect. Factors in the audit that were reported to contribute to the inability to manage the spectrum included one frequency manager to manage more than 50,000 assignments, no frequency management teams that could be deployed and frequencies being assigned without coordination with host nation and knowledge of equipment being used in theater. The following comments are provided to show gross omissions and errors.

One frequency manager for 50,000 assignments. This is grossly incorrect and completely misleading to justify the Services' inability to manage the spectrum effectively. CENTCOM had two frequency managers assigned. Furthermore, the Services supported CENTCOM with a JFMO-REAR, located first at McDill AFB (total of 5 people) and later moved to Buzzard Point in Washington DC. Additionally, ECAC provided database and automation support to CENTCOM on a 24 hours basis with on-call service. The statement further provides faulty assumptions and conclusions because the 50,000 assignments were made by a lot of other people, very few of which were made by the one person referred to in the audit. The 50,000 assignment number refers to records and is used to make a quantitative point to show workload comparison. However, this figure is being used out of context to illustrate the workload that one person supposedly "manages" constantly-- this is incorrect. CENTCOM with assistance from JFMO-REAR and ECAC was the repository for these 50,000 records. The 50,000 records were permanent assignment which did not include the thousands of tactical (temporary) assignments made and constantly managed by the maneuvering forces frequency managers. Audit report did not give credit to the tactical frequency managers at the various echelon levels who constantly manage their battlefield spectrum use which considers the known civil and permanent assignments within their environment.

3. Another fact that was left out is that the Army had frequency manager positions at the MSE battalions and brigades, at the division and corps signal staff office and at the Theater Army level staff. These positions were fully staffed during Desert Shield/Storm. These are the frequency managers who really managed and used portions of the 50,000 assignments. In fact, frequency

management is important to the tactical Army forces that the frequency manager for the XVIII Airborne Corps was aboard on the third aircraft to Saudi Arabia in the early days of August 1990.

4. Statement, "Because there were no frequency management teams that could be deployed to assist the frequency manager during Desert Storm ..." is incorrect and draws an unfair conclusion. The Army assembled and deployed a special team to assist in the early part of Desert Shield (See attached After Action Report). The Army also brought in augmentees to support the 6th Signal Command (Theater-Army) in late November 1990. The Air Force and Navy also augmented their forces with frequency managers.

5. Statement, "...frequencies were being assigned without host nations..." requires comments because there are mitigating factors which clearly have not been considered in making such a statement. First, there were no single government agency or military unit in Saudi Arabia that controlled or centrally managed the spectrum as we do in the United States. The fact is that local and regional coordination were being conducted with the military, (Saudi Army, Saudi National Guard, Saudi Airfields, US Marines, Coalition Forces and British Forces). Regional and local coordination was made with the civil authorities through the military structure. The fact that there was no formal Saudi Arabian spectrum management structure makes the statement misleading and leads to faulty conclusions. Second, Saudi political considerations made it difficult to coordinate with the host nation to receive the timely response and approval the military required from the pressing situation. No fighting commander can afford to wait days or weeks when lives and command and control are at stake, especially at a wartime conflict situation.

6. Statement, "Other factors that limit the effective management of the spectrum included the use of equipment without coordination among the services or the host nations. This resulted in equipment jamming, interference, and interoperability problems." is incorrect. Army spectrum dependent equipment deployed and used in Operation Desert Shield/Storm were J12 (DD Form 1494) approved by the MCEB. It would also be safe to say this was true of the other services. Coordination was conducted among the services during the development and fielding through the J12 process. Furthermore, it is the responsibility of each CINC to comment and coordinate on the supportability of each spectrum dependent equipment entering and operating in his area of operation. Results of jamming, interference and interoperability noted are unfair characterization and technically and operationally incorrect. By definition, jamming is a result totally unrelated to the context used. The Army will provide additional information on these topics upon clarification of the audit's intent.

7. Statement, "We believe that coordination among the Services is needed to manage the spectrum more effectively during contingency operations." should be changed to reflect the

CINC's role and responsibility for contingency operations. The Memorandum of Policy (MOP) 64 is a direct outcome from the lessons learned from Operations Desert Storm. Accordingly, the statement should be consistent with the MOP's intent. (See enclosed MOP 64).

**Final Report
Reference**

5, Para. 1

**ARMY MANAGEMENT COMMENTS
ON
DRAFT AUDIT REPORT ON DOD'S EVALUATION
AND ANALYSIS OF ELECTRONIC COMBAT**

PROJECT NO 2AB-0024

PART II - FINDING AND RECOMMENDATION

Effective coordination through Consolidation of Centers

MANAGEMENT COMMENTS: Nonconcur.

1. The Army position is that there is merit in the concept of co-location of the Services Frequency Management Agencies. The Army nonconcur that consolidation necessarily provides better frequency coordination.

2. Consolidation does not automatically equate to better coordinating. Coordination is conducted through various media such as Email, IDSS, meetings, working groups, telephone call and the FAX machine. It is doubtful that consolidation would radically change these means of coordination.

3. It is not clear how consolidation with exchanging of information on each services frequency assignments would reduce the potential for interference and interoperability problems. We constantly do that today at all levels. Statement is speculative without factual documentation.

4. Wording and language of sentence, "Also, with consolidated FMCs, better frequency coordination will enable the Military Departments to accomplish their mission successfully." implies that the Services are not currently accomplishing our mission successfully. Strongly recommend this be changed.

**Final Report
Reference**

1, Para. 2

**ARMY MANAGEMENT COMMENTS
ON
DRAFT AUDIT REPORT ON DOD'S EVALUATION
AND ANALYSIS OF ELECTRONIC COMBAT**

PROJECT NO 2AB-0024

PART I - INTRODUCTION-BACKGROUND

MANAGEMENT COMMENTS: NONCONCUR

1. Disagree with definition of Electronic Combat. EC denies use of a particular system. Where is the source of this definition?

2. The last sentence, page 1, infers that separate offices were set up to manage the electromagnetic spectrum as a result of EC. What is source of fact? Management of the frequency spectrum has been in existence for a very long time and predates EC.

3. Definition and aim of spectrum management function -- what is source of definition? Aim is not only users of communications-electronics but to balance the functional users of the spectrum - communications, intelligence, radio navigation, radars, and electronic combat in the theater tactical, sustaining base and strategic environments. Result is that the statements are used in the wrong context leading to incorrect assumptions and conclusions.

4. 50,000 frequencies in use is irrelevant to the importance of managing the spectrum. Importance is supporting the intent of the commander through smart use of the radio frequency spectrum to attain the commander's objective.

Objectives. Army objects to the additional review of the methods used by OSD and the Military Departments to manage the frequency spectrum. How did the audit analysis objective drift to review the methods used to manage the frequency spectrum? Rational and explanation is conspicuously missing on how and why the audit objective drifts into frequency management from the original intent of electronic warfare. The great bulk of the report focuses on frequency management without a direct change in the objectives of the audit.

**Final Report
Reference**

2, Para. 3

**ARMY MANAGEMENT COMMENTS
ON
DRAFT AUDIT REPORT ON DOD'S EVALUATION
AND ANALYSIS OF ELECTRONIC COMBAT**

PROJECT NO 2AB-0024

PART I - INTRODUCTION- INTERNAL CONTROLS

MANAGEMENT COMMENTS: NONCONCUR

1. Nonconcur with statement, "...OSD lacked the internal controls necessary to prevent the duplication of efforts in Frequency Management among the Military Departments." Internal controls are mandated by ITU radio regulations, NTIA Manual, OMB Circular, DOD Directives 4650.1, 3222.2, 5100.35, 5000.1, 5000.2, AR 5-12 and the other services regulations. There is a false assumption that duplicative efforts are conducted among the military services. Doing the same process does not mean duplication.
2. It is debatable and questionable if implementing the recommendations will correct "this" weakness. This statement appears to be a subjective statement based on an opinion. Recommendation is based on the assumption that by consolidation, internal controls are corrected. Additionally, if the issue is OSD internal controls then why is it that the recommendation is to consolidate the Services. The problem stated is OSD internal controls.

**Final Report
Reference**

2, Para. 4

**ARMY MANAGEMENT COMMENTS
ON
DRAFT AUDIT REPORT ON DOD'S EVALUATION
AND ANALYSIS OF ELECTRONIC COMBAT**

PROJECT NO 2AB-0024

PART I - INTRODUCTION - PRIOR AUDITS AND OTHER REVIEWS

MANAGEMENT COMMENTS: NONCONCUR

1. Prior Audits and Other Reviews. Report points out that Army and Air Force lacks central control. Analysis takes this information out of context and applies it to the OSD and joint functions which is not what the report addressed.

2. Other matters of Interest - this should be the primary scope of the report, yet this item becomes a secondary item.

Department of the Air Force



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS UNITED STATES AIR FORCE
WASHINGTON DC

21 DEC 1992

MEMORANDUM FOR ASSISTANT INSPECTOR GENERAL FOR AUDITING
OFFICE OF THE DOD INSPECTOR GENERAL

SUBJECT: DOD (IG) Draft Report, "DOD's Evaluation and Analysis
of Electronic Combat," (Project No. 2AB-0024) -
INFORMATION MEMORANDUM

This is in reply to your memorandum requesting the Assistant Secretary of the Air Force (Financial Management and Comptroller) to provide Air Force comments on subject report.

Appreciate the opportunity to comment on this draft report. The Air Force concurs with the evaluation results concerning the mission and management of the Air Force Electronic Warfare Center and the Joint Electronic Warfare Center. The IG finding of "no unwarranted duplication of effort between the Air Force Electronic Warfare Center (AFEWC) and the Joint Electronic Warfare Center (JEWEC)" is in agreement with findings of previous AF/XOFE informal inquiries. Maj Gen O'Shaughnessy, AFIC/CC, made the elimination of duplication of effort between these two centers a priority when he took command of (then) Electronic Security Command. He will be pleased that the DOD IG finding validates his effort.

Concerning DOD's management of the electromagnetic spectrum, however, the draft report presents an incorrect assessment, appears to ignore facts presented to the team by Air Force Frequency Management Agency personnel and others, and expresses conclusions that are not supported by documented evidence. The Air Force, therefore, does not concur with the finding, recommendation, estimated monetary benefits, or allegation of internal control weakness reflected in the subject draft report. Specific Air Force management comments are attached hereto.

If you need any further assistance, the Air Force points of contact are Lt Col Bill Belote or Mr. Nelson Pollack at the Air Force Frequency Management Agency, DSN 335-1807.

Carl G. O'Berry

CARL G. O'BERRY, Maj Gen, USAF
DCS/Command, Control,
Communications, and Computers

1 Atch
Air Force Management
Comments w/7 Appendices

cc: SAF/FMPF

**Final Report
Reference**

5, Para. 1

**AIR FORCE MANAGEMENT COMMENTS
ON
DRAFT AUDIT REPORT (PROJECT NO. 2AB-0024)**

PART II - FINDING - FREQUENCY MANAGEMENT WITHIN DOD

The electromagnetic spectrum is not being effectively managed within DOD. This condition exists because there is no centralized management of the spectrum within DOD, and there is little or no coordination between the Services' Frequency Management Centers. As a result, the ability of the Services to communicate and use the electromagnetic spectrum effectively could be adversely impacted as illustrated during the early phases of Operation DESERT STORM.

MANAGEMENT COMMENTS: Nonconcur.

The Air Force nonconcur with the finding in Part II - Finding and Recommendation, as well as the statement in the Executive Summary, under "Audit Results" which alleges that there is "no effective coordination between the Military Departments' Frequency Management Centers." The Air Force's position is that the electromagnetic spectrum is being effectively managed within DOD. Although the three Services' frequency management staffs and ECAC are currently separate agencies, they work together in a complementary fashion to effectively manage (to include planning coordinating, and controlling) DOD's use of the electromagnetic spectrum. In fact, DOD's use of the electromagnetic spectrum constitutes over 40 per cent of the total use by federal government agencies, and that use is probably the best managed within the federal government.

Numerous groups within the DOD spectrum management community exist to ensure DOD effectively manages its use of the spectrum and coordinates all use appropriately. Several initiatives undertaken in the past few years are enabling even more effective management and coordination of DOD's spectrum use.

First, the USMCEB Frequency Panel and its permanent working groups exist to ensure effective management and use of the spectrum within DOD. They in essence serve as "centralized management" fora and exercise authority within established policy and procedures. For example, the J-12 permanent working group (PWG) members from all concerned DOD agencies review every single application for frequency allocation processed for any DOD spectrum-dependent equipment -- a review process which occurs at least four times in the equipment life cycle. Thus, the allocation for every single piece of spectrum-dependent equipment that is to be used within DOD is coordinated on at least four separate occasions by members of a joint working group.

Atch 1

Second, every single permanent frequency assignment for DOD use within the CONUS is coordinated within the National Telecommunications and Information Administration (NTIA) Frequency Assignment Subcommittee, and those for use outside the CONUS are coordinated through the CINC Joint Frequency Management Office (JFMO) in whose area of responsibility the frequency will be used. Additionally, frequency allotment plans are used to specifically manage different portions of the electromagnetic spectrum.

Third, OASD(D-WC3) and Joint Staff/J6 established a Spectrum Management Review Group (SMRG) in early 1992 which is comprised of the senior spectrum managers for the military Services, along with senior representatives from the Joint Staff/J6, OASD(D-WC3), and others as required. This group was established to develop a strategic spectrum plan for DOD which will promote the efficient and effective use of the spectrum so that DOD spectrum needs can be met. Additionally, the group reviews the DOD spectrum management infrastructure and makes recommendations on how to make it more efficient and effective. Also, group members address and coordinate on other spectrum management issues (see appendix A).

Fourth, AF FMA personnel participate in over 60 committees, working groups, etc, in which they actively represent, advocate, defend, and coordinate AF interests on wide variety of spectrum issues (see appendix B). These bodies are comprised of representation which is DOD, national, and international in scope. All contribute to effective management and use of the electromagnetic spectrum within the purview of their charters.

Fifth, the military Services are linked to common spectrum management data bases through a distributed computing network, with the mainframe computer at ECAC and distributed computer facilities at various CINC JFMOs and Service frequency management offices. Also, the Interoperability Decision Support System (IDSS) is an on-line, dial-in, multi-user system that provides 24-hour-a-day, worldwide access to some spectrum management information and provides an electronic mail capability. The IDSS provides yet another means to the CINCs, Services, and others to coordinate and exchange data and information concerning DOD spectrum management matters.

Sixth, the USMCEB Frequency Panel's 208z permanent working group was formed in Apr 90 to develop an automated DOD spectrum management architecture. Efforts in this regard are now bearing fruit. An operational Joint Spectrum Management System (JSMS) is now fielded, and other Service systems are now being fielded. These systems offer spectrum analysis, administrative, etc, capabilities that are acknowledged as the flagship capabilities worldwide in this regard. These automation tools greatly enhance the ability of DOD frequency managers to effectively plan, coordinate, and control DOD's use of the electromagnetic spectrum.

Seventh, through applying state-of-the-art automation capabilities to spectrum management in the Services' Frequency Management Centers during the past few years, great improvements were realized in the effectiveness and efficiency with which frequency managers process and coordinate frequency allocation and assignment requests. For example, the Air Force Frequency Management Agency implemented all electronic processing of frequency assignment requests from the initiation of the request at any level to the notification back to the requester of assignment approval. The average processing time for an Air Force assignment action was decreased from 120 or more days to 30-40 days by using personal computers, CD-ROM readers, electronic transmission via DISNET, DDN, etc, with no air gap interfaces, an electronic bulletin board to post assignment status information, dial-up modems, STU-IIIs, and other automation tools. This compares to 180 days that is currently required to process an assignment request within the Department of Interior, for example.

Any shortfall in effectively managing and using the spectrum in DOD is not because of little or no coordination among the Services' Frequency Management Centers or no centralized management of the spectrum within DOD by an organization exercising authority over the FMCs. The 1989 Air Force-Army Functional Management Inspection (FMI) Report, "Radio Spectrum Management in Joint Tactical Operations," mentioned in Part I of the draft audit report, actually indicated a lack of centralized management of the spectrum that properly encompassed the major users of the spectrum, i.e., the intelligence, electronic warfare, and communications communities. The supported CINC JFMO is responsible to accomplish this coordination for a joint military operation. Nonetheless, other recent initiatives are also serving to improve coordination between the spectrum management community and the intelligence, as well as electronic warfare, communities concerning use of the spectrum.

In the past, a lack of coordination between the major communities using the electromagnetic spectrum and the frequency management community did degrade the ability of the frequency managers to ensure DOD effectively managed and used the spectrum resource. Publication of joint policy in the form of JCS MOP 64 and Joint Publication 3-51, however, provides specific policy in two documents which respectively address use of the electromagnetic spectrum in joint military operations and coordination of spectrum use requirements of the intelligence, electronic warfare, etc, communities by the Joint Commander's Electronic Warfare Staff.

Another initiative involves the development by the Air, Land, Sea Application (ALSA) Center of a techniques, tactics, and procedures pamphlet which will be a joint publication to provide procedures for CINCs to use in implementing MOP 64 policy. These documents are critical because it is the responsibility of the CINC Joint Frequency Management Office (JFMO), not the Services'

frequency management offices, to manage the use of the spectrum in the CINCs area of responsibility in a Joint or coalition warfare operation such as Operation DESERT STORM. Nonetheless, during Operation DESERT SHIELD, the Services' frequency management offices were requested by USCINCCENT to help because of their capability. In response to the request, the AF FMA formed a rear echelon of the USCINCCENT JFMO (JFMOCENT Rear) with augmentation from the other military Services and did an absolutely superb job managing spectrum use for Operation DESERT STORM. In an unprecedented coalition force operation, over 59,000 frequency assignments were processed by JFMOCENT Rear prior to commencement of the attack by coalition forces.

The foregoing comments should serve to illustrate the point that the electromagnetic spectrum is in fact being managed and used very effectively within DOD in both peacetime and wartime. This is not to say that further improvements cannot be made. In fact, a significant endeavor to do just that is well underway in the form of a DOD Corporate Information Management (CIM) initiative which was approved and funded by the DOD Director of Defense Information. Under this initiative, the CIM methodology is being employed using Integrated Computer-aided Manufacturing Definition language, a core team, and subject matter experts with assistance from a professional, contracted facilitator/trainer to model DOD's management and use of the electromagnetic spectrum. Phase 1 of this effort, completed in Sep 92, resulted in the identification of about 80 opportunities to improve the way DOD manages and uses the electromagnetic spectrum.

It is interesting to note that the national defense forces of four US allies are so convinced of DOD's effectiveness in managing and using the spectrum that they agreed in May 92 to implement the DOD system as their standard way to manage their use of the spectrum.

**Final Report
Reference**

8, Para. 3

**AIR FORCE MANAGEMENT COMMENTS
ON
DRAFT AUDIT REPORT (PROJECT NO. 2AB-0024)**

PART II - FINDING AND RECOMMENDATION - POTENTIAL SAVINGS

The potential savings cannot be fully quantified until a final organizational structure is determined. Currently, the three FMCs have a total of 86 billets with a total Operation and Maintenance estimated budget of \$4.4 million. Of the 86 billets, 23 are military and 63 are civilian. If the FMCs were consolidated, 28 civilian billets could be eliminated for an annual savings of approximately \$2.0 million. This number was derived by analyzing the organization charts and determining the number of personnel assigned to processing frequency allocations and assignments. The billets would be eliminated by reducing the duplication of data base support, clerical, and administrative positions. In addition, ECAC could reduce operating expenses by eliminating the distribution of the FRRS updates to the FMCs. This consolidation is in line with the Defense Management Report goal of streamlining management and reducing overhead costs while maintaining military strength. The consolidation of the FMCs could result in annual savings of as much as \$2.0 million.

MANAGEMENT COMMENTS: Nonconcur.

The Air Force nonconcur with the Finding regarding the estimated potential savings of \$2.0M based on the following:

According to the draft report, "This number was derived by analyzing the organization charts and determining the number of personnel assigned to processing frequency allocations and assignments." No real breakout of the savings is included in the report; therefore, it is impossible to determine precisely how the figure of 28 civilian authorizations was determined. If one concludes that these billets were part of those involved in processing frequency allocations and assignments, then none of the 28 are Air Force personnel because no AF FMA clerical personnel are assigned to processing frequency allocations and assignments (see appendix C). Thus, in the AF FMA it would be impossible to eliminate any billets as stated in the draft report, "...by reducing the duplication of data base support, clerical and administrative positions..." associated with the processing of frequency assignments and allocations.

Actually, almost all AF FMA Systems Engineering Division personnel who process allocations are graduate engineers, several with Master's Degrees in Electronic Engineering. Similarly, the Technical Services Division personnel who process frequency assignment requests are either high school graduates with Associate's Degrees or college graduates with Bachelor's Degrees. Most of the civilians were recruited from the military spectrum management career field. In fact, since much time is used by the allocation engineers and assignment action officers doing their

own administrative and clerical work, a more realistic Finding would be to increase the amount of administrative support to the allocation/assignment process.

The Finding does not specify or give examples of "duplication of data base support." This alleged duplication of data base support is difficult to understand since all engineers and assignment personnel in the three FMCs use the same data bases maintained by ECAC in the performance of their duties.

The OSD-funded CIM initiative to model DOD's Management and Use of the Electromagnetic Spectrum (MUES) will result in the identification of any ways to realize savings and lead to an appropriate determination concerning a recommended DOD organizational structure to manage DOD's use of the electromagnetic spectrum. As stated in the draft report, "The potential savings cannot be fully quantified until a final organizational structure is determined."

**Final Report
Reference**

9, Para. 2

**AIR FORCE MANAGEMENT COMMENTS
ON
DRAFT AUDIT REPORT (PROJECT NO. 2AB-0024)**

PART II - RECOMMENDATION FOR CORRECTIVE ACTION

We recommend that the Deputy Secretary of Defense consolidate the Services' Frequency Management Centers under the Electromagnetic Compatibility Analysis Center and transfer the personnel and funds to accomplish the consolidation.

MANAGEMENT COMMENTS: Nonconcur.

The Air Force nonconcur with the Recommendation that the Services should consolidate "under" the DOD ECAC. The Draft report apparently does not take into account the fact that the DOD ECAC and the FMCs were created with different, but complementary, roles and missions. The major functions of the DOD ECAC are to serve as the chief repository of the various data bases crucial to DOD spectrum management, provide EMC analyses when requested and reimbursed, and develop cost-effective spectrum management tools as required. On the other hand, the Service FMCs were created to represent, advocate, and defend their Service's spectrum requirements in negotiating national and international spectrum management policy, develop Department-level spectrum management policy, assist in planning and programming to satisfy their Service spectrum management requirements, coordinate all Service requests for frequency allocation and assignment approval, and to represent, advocate, and defend the Services' interests concerning a wide variety of Department, JCS, DOD, National and International spectrum management issues.

Further, the Service FMCs and DOD ECAC have effectively worked together in their different spheres. In fact, a follow-up Air Force study completed in Mar 90 accomplished as an adjunct to staffing Defense Management Review #0064, ultimately reached this conclusion contrary to the conclusion of the previous study referenced in Part I of the draft audit report (see appendix D). Further investigation in the follow-up study resulted in the following, i.e., "In conclusion, this DMR effort has proven that there are few, if any, overlapping roles among the various organizations involved in spectrum management. Their roles are more complementary in nature. In addition, there appears to be no significant benefit to the DOD in realigning any of the specific organizations. The current structure serves them each well." The AF/SC approved closing out the DMR initiative.

With the foregoing in mind, the Air Force nonetheless concurs that there appears to be some advantages to consolidating the Services' FMCs and (not under) ECAC into a new organization. In fact, a notional organization chart (see appendix F) was

developed in Sep 92 by AF FMA personnel. The Air Force does, however, hold some serious concerns that must be addressed and satisfied before it will fully support a consolidation. First, the new organization obviously must continue to provide the Air Force support that is responsive and equal to or better than the support the AF FMA is presently providing, both during the transition and afterwards. Secondly, the new organization must in some way retain an Air Force advocate, ombudsman or whatever, to represent, advocate, and defend AF spectrum interests. This is also true for the Army and Navy. Thirdly, the new organization must be structured such that the Service senior communicators, i.e., the USMCEB Principals, have their own single point of contact for spectrum matters.

Other considerations also deserve attention. The draft report highlights that spectrum-dependent equipment was used during Operation DESERT STORM without coordination among the Services or the host nations. The Air Force concurs; however, the cited failure of spectrum-dependent equipment users to coordinate with the CINC JFMO personnel or any other frequency managers is independent of the FMCs' organizational structure. The Air Force also believes that better coordination among the Services is needed to manage the spectrum more effectively during contingency operations.

Further, the Air Force fully concurs with the statements in the draft report that "... we believe there could be benefits and possibly monetary savings by consolidating the FMCs with ECAC. All FMCs could use the same standardized automated systems for processing frequency allocations and assignments." The latter statement, however, is true regardless of whether or not the FMCs are consolidated with ECAC. In fact, as previously stated, the FMCs today exchange information on each Service's frequency assignments.

AIR FORCE POSITION

It is the Air Force position that any consolidation decision be deferred until the ongoing CIM initiative to model DOD's management and use of the electromagnetic spectrum is completed. At that time, OASD(C3I), Joint Staff/J6, and the Services can use the results of this and other studies underway to determine the most appropriate organizational structure within DOD to address DOD's management and use of the electromagnetic spectrum.

In fact, the AF/SC and DA/SAIS each wrote a memorandum to the OASD(C3I) Director, Defense Information on 28 Oct 92 recommending this course of action. On 29 Oct 92, the Defense Information Infrastructure Coordination Group endorsed these recommendations (see appendix E).

**Final Report
Reference**

2, Para. 3

**AIR FORCE MANAGEMENT COMMENTS
ON
DRAFT AUDIT REPORT (PROJECT NO. 2AB-0024)**

PART I - INTRODUCTION - INTERNAL CONTROLS

We assessed internal control procedures associated with the DOD's oversight, management, and coordination of Electronic Combat Missions among the military departments. We determined that OSD and the military departments have internal controls to avoid the duplication of electronic combat systems. However, OSD lacked the internal controls necessary to prevent the duplication of efforts in frequency management among the military departments.

Implementation of the Recommendation in this report will correct this weakness. A copy of the report is provided to the senior officials responsible for internal controls within the office of the Secretary of Defense and the military departments.

MANAGEMENT COMMENTS: Nonconcur.

The Air Force nonconcur with the statements that "... OSD lacked the internal controls necessary to prevent duplication of efforts in frequency management among the military departments. Implementation of the Recommendation in this report will correct this weakness." As previously stated in the management comments with respect to the finding, the numerous committees, working groups, etc, within the spectrum management community such as the USMCCEB Frequency Panel and its permanent working groups exist to prevent the duplication of efforts in frequency management among the military departments.

Additionally, OASD(D-WC3) is taking a much more active role concerning DOD spectrum management, for example, through the Spectrum Management Review Group. Total coordination of all DOD frequency allocations and assignments precludes duplication of efforts concerning them. Initiatives both already implemented and underway serve to preclude duplication of effort in the application of automation to accomplish spectrum management tasks. For example, a memorandum of agreement among PACAF, ECAC, and the AF FMA was consummated to avoid any duplication of effort concerning the Joint Spectrum Management System and the Air Force Command and Control Frequency Resource Record System (see appendix F).

Since no examples of duplication of effort are addressed in the draft audit report to substantiate the conclusion, it is impossible to respond to any specific perceived duplication of effort. Nonetheless, the Air Force position is that the CIM initiative, in particular, and others already underway will result in implementation of various improvements in DOD spectrum management that will preclude any future duplication of efforts in frequency management within DOD.

**AIR FORCE MANAGEMENT COMMENTS
ON
DRAFT AUDIT REPORT (PROJECT NO. 2AB-0024)**

MANAGEMENT COMMENTS ON CONDUCT OF THE AUDIT:

During the audit, OAIG-AUD personnel failed to keep AF FMA management informed of audit progress, changes in audit objectives, and potential finding. Only in response to inquiries was AF FMA management informed, and then only partially. Further, no explanation is contained in the draft report that addresses the departure from the audit's stated objective. Also, IG personnel did not hold a closing conference with the AF FMA Commander or his staff to discuss results of their audit work.

DOD IG personnel also did not elect to furnish AF FMA management an outline of tentative findings and recommendations with an opportunity for AF FMA personnel to make preliminary comments and provide additional information before the draft report was issued. Apparently, only OASD(DW-C3) was provided this outline and opportunity. Without any chance for verification, AF FMA was unable to work out potential conflicts or correct errors before the draft report was released for comment.

Numerous hours were expended by a multitude of AF FMA personnel with DOD IG personnel in sessions at the AF FMA, and much verbal and written information was provided to the IG personnel. Unfortunately, most of that information apparently was not used judging from the finding, recommendation and other information contained in the draft report. Additionally, some of the information that was selectively used is presented in a misleading way.

AIR FORCE RECOMMENDATION

The Air Force recommends that OAID-AUD personnel rewrite the draft audit report limiting its scope and content to the original objective, i.e., DOD's evaluation of the mission and management of AFEWC and JEWC. The Air Force further recommends that the DOD IG support the position of the Defense Information Infrastructure Coordination Group to defer any consolidation decision pending ongoing JCS review and CIM initiative results.

7 Appendices

- A. Report for Jt Freq Panel, 2 Apr 92
- B. AF FMA Participants, 13 Nov 92
- C. AF FMA EUMD Extract, 12 Nov 92
- D. Staff Summary Sheet, 16 Mar 90
- E. AF/SC & DA/SAIS Memoranda, 28 Oct 92
- F. MOA, 12 Jun 92
- G. Notional DSMA Org Chart, 4 Sep 92

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